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IN THE CLAIMS

1. (currently amended) An electrochemical cell for separating a first gas from a mixture of gas comprising:

5 a first electrode in fluid communication with an inlet for receiving the mixture of gas;  
a second electrode in fluid communication with an outlet for the first gas; and  
a hydroxide-conducting membrane between the first electrode and the second electrode,  
wherein the membrane comprises a composite of a cross-linked polymeric structure and a  
hydroxide-conducting medium.

2. (canceled)

3. (canceled)

4. (canceled)

5. (currently amended) The electrochemical cell as in claim 41, wherein the polymeric structure comprises a polymerization product of one or more monomers selected from the group of water soluble ethylenically unsaturated amides and acids.

6. (original) The electrochemical cell as in claim 5, wherein the polymeric structure further comprises a water soluble or water swellable polymer.

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7. (original) The electrochemical cell as in claim 6, wherein the polymeric structure water soluble or water swellable polymer is selected from the group consisting of polysulfone, poly(sodium 4-styrenesulfonate), carboxymethyl cellulose, sodium salt of poly(styrenesulfonic acid-co-maleic acid), corn starch and combinations comprising at least one of the foregoing water soluble or water swellable polymers.

8. (original) The electrochemical cell as in claim 6, wherein the polymeric structure is formed on a substrate.

9. (original) The electrochemical cell as in claim 8, wherein the substrate is selected from the group consisting of polyolefin, polyvinyl alcohol, cellulose and polyamide.

10. (original) The electrochemical cell as in claim 5, wherein the hydroxide-conducting medium is added prior to polymerization.

11. (original) The electrochemical cell as in claim 5, wherein the hydroxide-conducting medium is added after polymerization.

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12. (original) The electrochemical cell as in claim 5, wherein the one or more monomers is selected from the group consisting of methylenebisacrylamide, acrylamide, methacrylic acid, acrylic acid, 1-vinyl-2-pyrrolidinone, N-isopropylacrylamide, fumaramide, fumaric acid, N, N-dimethylacrylamide, 3,3-dimethylacrylic acid, the sodium 5 salt of vinylsulfonic acid and combinations comprising at least one of the foregoing monomers.

13. (original) The electrochemical cell as in claim 5, wherein the polymeric structure further comprises a cross-linking agent.

14. (original) The electrochemical cell as in claim 13, wherein the cross-linking agent is selected from the group consisting of methylenebisacrylamide, ethylenebisacrylamide, any water-soluble N,N'-alkylidene-bis(ethylenically unsaturated amide) and combinations comprising at least one of the foregoing crosslinking agents.

15. (original) The electrochemical cell as in claim 5, wherein the polymeric structure further comprises a polymerization initiator.

16. (original) The electrochemical cell as in claim 15, wherein the polymerization initiator is selected from the group consisting of ammonium persulfate, alkali metal

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persulfates and peroxides and combinations comprising at least one of the foregoing initiators.

17. (currently amended) An electrochemical cell for separating a first gas from a mixture of gas comprising:

a first electrode in fluid communication with an inlet for receiving the mixture of gas;

a second electrode in fluid communication with an outlet for the first gas; and

5 a hydroxide-conducting membrane between the first electrode and the second electrode  
The electrochemical cell as in claim 1, wherein the hydroxide-conducting membrane  
electrolyte consists essentially of a composite of a cross-linked polymeric molecular  
structure and a hydroxide-conducting medium.

18. (canceled)

19. (canceled).

20. (currently amended) The electrochemical cell as in claim 18, wherein the polymeric structure comprises a polymerization product of one or more monomers selected from the group of water soluble ethylenically unsaturated amides and acids.

21. (original) The electrochemical cell as in claim 20, wherein the polymeric structure further comprises a water soluble or water swellable polymer.

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22. (original) The electrochemical cell as in claim 21, wherein the polymeric structure water soluble or water swellable polymer is selected from the group consisting of polysulfone, poly(sodium 4-styrenesulfonate), carboxymethyl cellulose, sodium salt of poly(styrenesulfonic acid-co-maleic acid), corn starch and combinations comprising at least one of the foregoing water soluble or water swellable polymers.

23. (original) The electrochemical cell as in claim 20, wherein the polymeric structure is formed on a substrate.

24. (original) The electrochemical cell as in claim 23, wherein the substrate is selected from the group consisting of polyolefin, polyvinyl alcohol, cellulose and polyamide.

25. (currently amended) The electrochemical cell as in claim 20, wherein the hydroxide-conducting electrolyte-medium is added prior to polymerization.

26. (currently amended) The electrochemical cell as in claim 20, wherein the hydroxide-conducting electrolyte-medium is added after polymerization.

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27. (original) The electrochemical cell as in claim 20, wherein the one or more monomers is selected from the group consisting of methylenebisacrylamide, acrylamide, methacrylic acid, acrylic acid, 1-vinyl-2-pyrrolidinone, N-isopropylacrylamide, fumaramide, fumaric acid, N, N-dimethylacrylamide, 3,3-dimethylacrylic acid, the sodium 5 salt of vinylsulfonic acid and combinations comprising at least one of the foregoing monomers.

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28. (original) The electrochemical cell as in claim 20, wherein the polymeric structure further comprises a cross-linking agent.

29. (original) The electrochemical cell as in claim 28, wherein the cross-linking agent is selected from the group consisting of methylenebisacrylamide, ethylenebisacrylamide, any water-soluble N,N'-alkylidene-bis(ethylenically unsaturated amide) and combinations comprising at least one of the foregoing crosslinking agents.

30. (original) The electrochemical cell as in claim 29, wherein the polymeric structure further comprises a polymerization initiator.

31. (original) The electrochemical cell as in claim 30, wherein the polymerization initiator is selected from the group consisting of ammonium persulfate, alkali metal

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persulfates and peroxides and combinations comprising at least one of the foregoing initiators.

32. (canceled)

33. (canceled)

34. (canceled).

35. (currently amended) An electrochemical cell for separating a first gas from a mixture of gas comprising:

a first electrode in fluid communication with an inlet for receiving the mixture of gas;

a second electrode in fluid communication with an outlet for the first gas; and

5 a hydroxide-conducting membrane between the first electrode and the second electrode The electrochemical cell as in claim 1, wherein the membrane comprises an anion exchange membrane.

36. The electrochemical cell as in claim 35, wherein the anion exchange membrane comprises a polymer having quaternary salt functional groups.

37. (original) The electrochemical cell as in claim 1, wherein the first gas is oxygen and the mixture of gas is air.

38. (canceled)

39. (original) The electrochemical cell as in claim 17, wherein the first gas is oxygen and the mixture of gas is air.

40. (canceled)

41. (original) The electrochemical cell as in claim 35, wherein the first gas is oxygen and the mixture of gas is air.

42. (original) The electrochemical cell as in claim 1, further comprising a voltage source for applying a voltage across the a first electrode and the a second electrode.

43. (original) The electrochemical cell as in claim 1, further comprising a conductor between the a first electrode and the a second electrode.

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44. (new) The electrochemical cell as in claim 17, further comprising a voltage source for applying a voltage across the a first electrode and the a second electrode.

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45. (new) The electrochemical cell as in claim 17, further comprising a conductor between the a first electrode and the a second electrode.

46. (new) The electrochemical cell as in claim 35, further comprising a voltage source for applying a voltage across the a first electrode and the a second electrode.

47. (new) The electrochemical cell as in claim 35, further comprising a conductor between the a first electrode and the a second electrode.

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